HDBaseT Extender Set 70m User Guide

Model CM-BT10-TXRX70

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Manufacturer Clare Controls, Inc.
7519 Pennsylvania Ave., Suite 104, Sarasota, FL 34243, USA

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Contact information For contact information, see www.clarecontrols.com.

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Introduction

The extender set consists of a transmitter and receiver pair. HDMI signals are input into the transmitter and HDBaseT technology is used to transmit the signals to the receiver up to 230 ft. (70 m) via a Cat5e/Cat6 cable. The receiver then outputs the HDMI signal.

Bi-directional IR and RS232 are also transmitted across the Cat5e/Cat6 cable. The extender set supports CEC, bi-directional RS232 and IR control, and PoC, which can be used to power the receiver via the Cat5e/Cat6 cable. This eliminates the need for power at the receiver end.

Features

- Supports full HD: Delivers high-resolution image (1080p at 60 Hz, 3D, 4K × 2K at 30 Hz)
- Maximum transmission distance is 230 ft. (70 m) over single a CAT5e/CAT6 cable, or 40 meters for 4Kx2K at 30 Hz
- High bandwidth: 10.2 Gbps
- HDTV compatible: Uses HDMI 1.4 and is HDCP-2.2 compliant
- Support PoC (Power Over Cable) and CEC
- Connects with a displayer to transmit EDID and Hot Plug Detect (HPD) signals constantly via the CAT5e/Cat6 cable
- Uses HDBaseT technology for extended capability and reliability
- Bi-directional RS232/IR control
- LED indicators show working status to aid in troubleshooting
- Wall or table mount aluminum enclosure
- External power supply (100~240 VAC, 50/60 Hz)

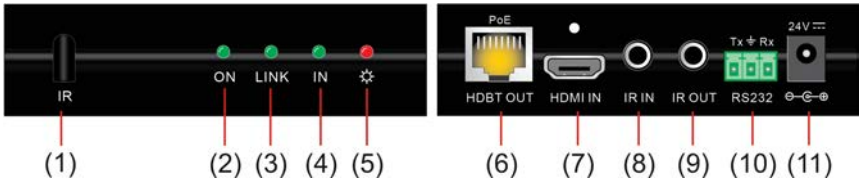
Package contents

- 1 x CM-BT10-TX70 HDBaseT transmitter
- 1 x CM-BT10-RX70 HDBaseT receiver
- 1 x 3.5 mm male mono to 3.5 mm male stereo IR adapter cable
- 4 x detachable mounting ears
- 2 x RS232 cables (DB9 to 3-pin connector)
- 8 x screws
- 1 x power adapter (24 VDC)
- 1 x user manual
- 1 x IR emitter

Notes: Ensure all the accessories are included. If not, contact your dealer.

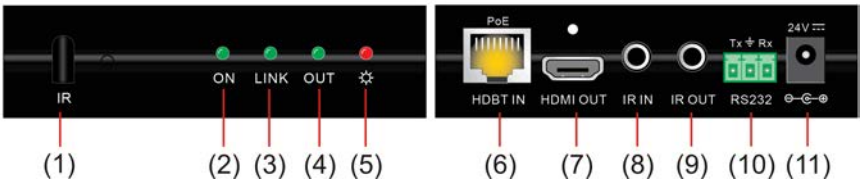
Product appearance

Figure 1: The CM-BT10-TX70 transmitter



(1) IR	IR receiver.
(2) ON	Working status indicator of this device. When the CM-BT10-TX70 is on and working properly, the green LED blinks.
(3) LINK	HDBaseT link status indicator, green LED. It remains illuminated when the device has a connection.
(4) IN	The LED remains on when connected with devices that support HDCP and are working normally. If the devices do not support HDCP, this green LED blinks.
(5) POWER LED	The red LED illuminates and stays on when power is connected.
(6) HDBT OUT	Connects via a single Cat5e/Cat6 cable to the HDBaseT port on the CM-BT10-RX70 receiver.
(7) HDMI IN:	Connect to the HDMI source device.
(8) IR IN:	Connects to an IR receiver. The IR signal received from this port will be transmitted via HDBaseT to the transmitter unit for use at the source location. **Notes** When using a control system such as Clare Controls, Crestron, or URC, the 3.5 mm male mono to 3.5 mm male stereo adapter cable (included) must be used. The male mono end connects to the control system; the male stereo end connects to the CM-BT10-TX70. When an IR receiver connects to this port, the front IR port (1) is unavailable.
(9) IR OUT:	IR signals received by the CM-BT10-RX70 and sent via HDBaseT to the CM-BT10-TX70 are available for emitter use from this port.
(10) RS232:	RS232 connector. Supports bi-directional RS232 communication.
(11) 24V DC:	Connects to the power supply.

Figure 2: The HDBaseT Extender Set receiver



(1) IR	IR receiver.
(2) ON	Working status indicator of this device. When the CM-BT10-RX70 is on and working properly, the green LED blinks.
(3) LINK	HDBaseT link status indicator, green LED. Remains illuminated when there is a connection.
(4) OUT	The LED remains illuminated when connected with devices that support HDCP, and the HDCP handshake is working normally. If the devices do not support HDCP, this green LED blinks.
(5) POWER LED	The red LED illuminates and stays illuminated when power is connected.
(6)HDBT IN	Connects via single Cat5e/Cat6 cable to the HDBaseT port in the CM-BT10-TX70 transmitter or the CM-MT4410-BT-70 matrix switch.
(7) HDMI OUT:	Connect to the HDMI display device.
(8) IR IN:	Connects to an IR receiver. The IR signal received from this port is transmitted via HDBaseT to the transmitter unit for use at the source location. **Note:** When an IR receiver connects to this port, the front IR port (1) is unavailable.
(9) IR OUT:	IR signals received by the CM-BT10-TX70 or CM-MT4410-BT-70 and sent via HDBaseT to the CM-BT10-RX70 are available for emitter use from this port.
(10) RS232:	RS232 connector. Supports bi-directional RS232 communication.
(11) 24V DC:	Connects to the power supply. Not required when using PoC supplied by the CM-BT10-TX70 or CM-MT4410-BT-70.

System connection

Usage precautions

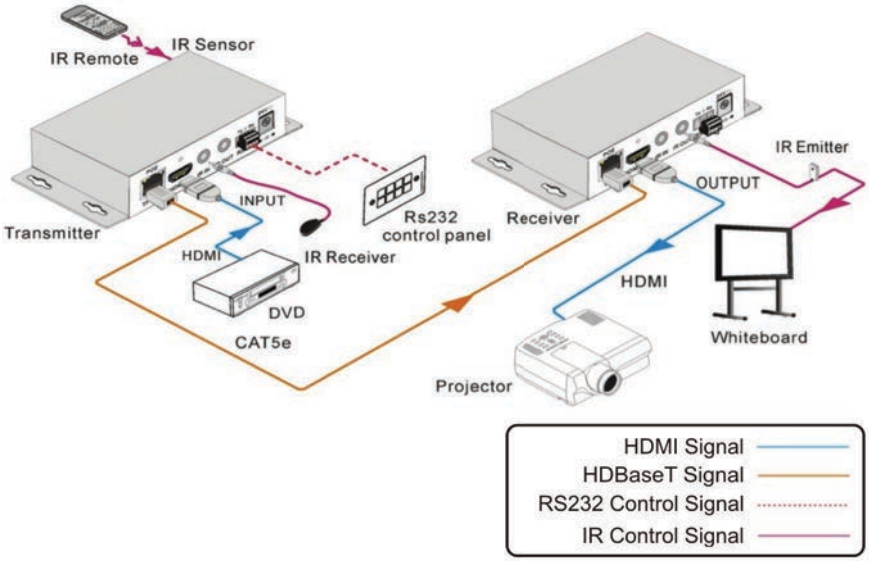
- System should be installed in a clean environment and have proper temperature and humidity controls.
- All of the power switches, plugs, sockets, and power cords should be insulated for safety.
- All devices should be connected before powering on.
- The Cat5e/Cat6 terminations for HDBaseT devices should be a straight-thru TIA/EIA T568B standard.

Application examples

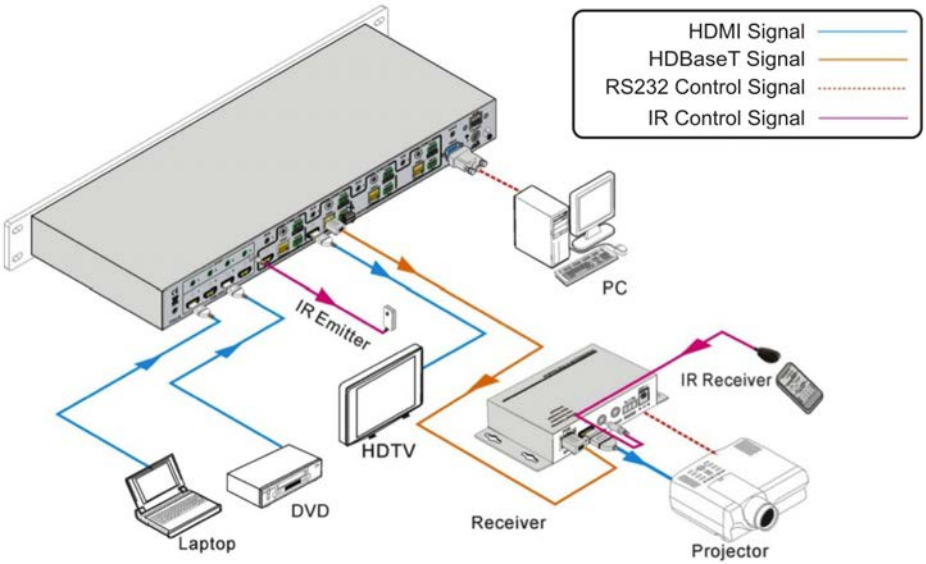
The CM-BT10-RX70 HDBaseT receiver works in conjunction with the CM-BT10-TX70 HDBaseT transmitter or an HDBaseT matrix switch, such as the CM-MT4410-BT-70. By transmitting signals across reliable Cat5e/Cat6 cables, the video signal can be used at far greater distances from the source device than would be capable with traditional HDMI cables. Additionally, control signals can be sent bi-directionally across the same Cat5e/Cat6 cable. The following figures show you some application examples for the CM-BT10-TXRX70 extender set and/or the CM-BT10-RX70 receiver.

Note: When using a control system, such as Clare Controls, Crestron, or URC, the 3.5 mm male mono to 3.5 mm male stereo adapter cable (included) must be used. The male mono end connects to the control system; the male stereo end connects to CM-BT10-TX70.

Example 1: CM-BT10-TXRX70 - HDBaseT Extender Set



Example 2: CM-MT4410-BT-70 with CM-BT10-RX70



Connection procedure

To connect the HDBaseT Extender Set 70m

1. Connect HDMI from the source (such as Blu-ray DVD) to the HDMI IN port of the transmitter using an HDMI cable.
2. Connect the HDBT OUT port of the transmitter to the HDBT IN port of the receiver with a single CAT5e/CAT6 cable using TIA/EIA T568B terminations at each end.
3. Connect the HDMI OUT port of the receiver to an HDMI in port on the display using an HDMI cable.
4. When using the bi-directional IR control, do the following.
    a. Connect the IR emitter at either end to the IR TX port on either the CM-BT10-TX70 or the CM-BT10-RX70.
    b. When using a powered IR receiver, connect via a 3.5 mm stereo plug to the IR RX on either the CM-BT10-TX70 or the CM-BT10-RX70.
    c. When using a control system to send IR signals, you must use the included 3.5 mm male mono to 3.5 mm male stereo cable adapter. Use a standard 3.5 mm male mono connector from the control system to the male side of the adapter cable. Plug the 3.5mm male stereo side of the adapter into the IR RX port on the CM-BT10-TX70.
5. When using the bi-directional RS232 control, two adapter cables are included for conversion from the 3-pin connector to DB9 connectors.

    Note: Only pins 2,3 & 5 are used on the DB9 (Rx, TX, Gnd).

Application

The CM-BT10-TXRX70 extender pair is useful in any scenario when an HDMI signal (along with control signals) must be transmitted reliably across greater distances than is practical using traditional HDMI cables. They may be used in both residential and commercial applications when centrally locating the source equipment and displaying HD video in remote locations. The CM-BT10-RX70 can also be used in conjunction with an HDBaseT matrix switch (such as the CM-MT4410-BT-70) to allow the sharing of source content across multiple displays.

Note: When connecting your extender set to a TV cable box that transmits HDMI 1.2, you must use an HDMI 1x2 Splitter (model CM-SP1210-HD) between the TV cable box and the extender set receiver (model CM-BT10-TX70) The HDMI 1x2 Splitter converts the HDMI 1.2 signal coming from the cable box to a compliant signal (HDMI 1.3, 1.4).

Twisted pair cable connection

The Cat5e/Cat6 terminations for HDBaseT devices should be a straight thru TIA/EIA T568B standard. TIA/EIA T568A standard is NOT recommended.

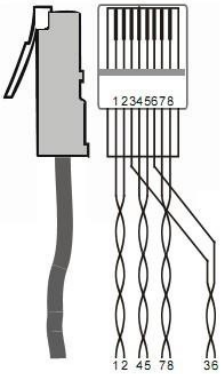
Table 1: T568A and T568B cable standards

TIA/EIA T568A	
Pin	**Cable color**
1	green white
2	green
3	orange white
4	blue
5	blue white
6	orange
7	brown white
8	brown

1st Ground	4-5
2nd Ground	3-6
3rd Group	1-2
4th Group	7-8

TIA/EIA T568B	
Pin	**Cable color**
1	orange white
2	orange
3	green white
4	blue
5	blue white
6	green
7	brown white
8	brown

1st Ground	4-5
2nd Ground	1-2
3rd Group	3-6
4th Group	7-8



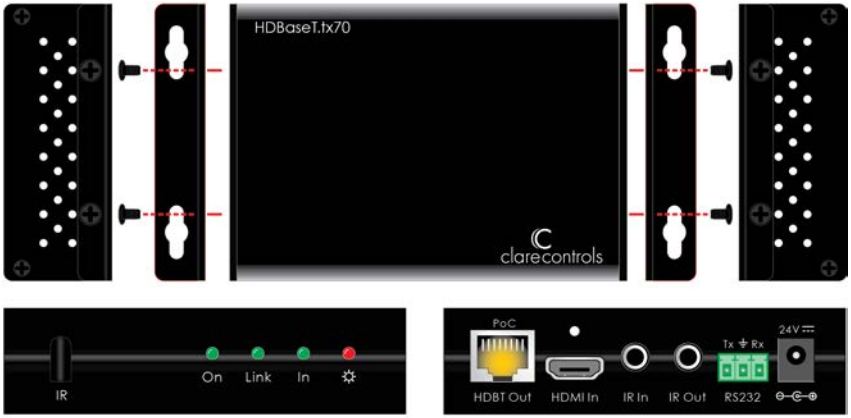
Note: RJ45 EZ connectors should not be used at any time.

Specifications

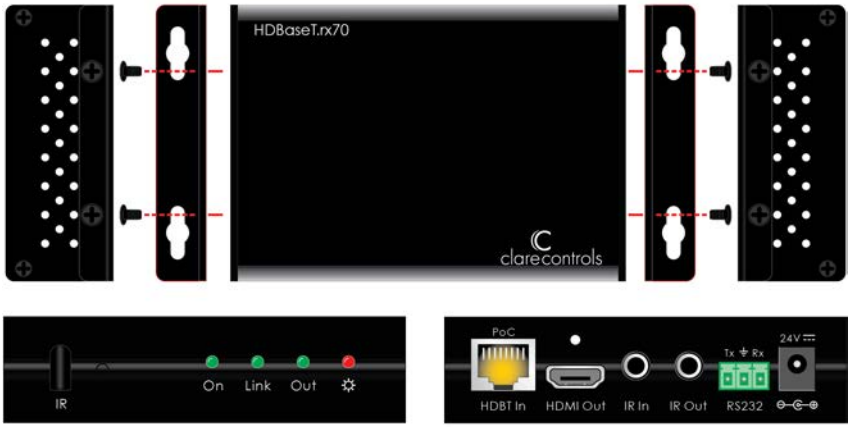
	Transmitter (CM-BT10-TX70)	Receiver (CM-BT10-RX70)
Input		
Input signal	1 HDMI,1 IR & 1 RS232	1 IR, 1 RJ-45 and 1 RS232
Input connector	HDMI male, 3.5 mm mini jack, 3p captive screw connector	3.5 mm mini jack, RJ-45, 3p captive screw connector
Video signal	HDMI1.4	HDMI1.4
Audio	Digital audio, transmit through HDMI audio	Digital audio, transmit through HDMI audio
Output		
Output	1 IR, 1 RJ45, and 1 RS232	1 HDMI, 1 IR, 1 RS232
Output connector	3.5 mm mini jack, RJ45, 3p captive screw connector	HDMI male, 3.5 mm mini jack, 3p captive screw connector
Video signal	HDMI 1.4	HDMI 1.4
Transmission mode	HDBaseT	HDBaseT
General		
Resolution range	800 x 600 to 1920 x 1200, 1080p, 3D, 4Kx2K at 30 Hz	
Transmission distance	Maximum distance 230 ft. (70 m), 1080p 60 Hz, 4Kx2K at 30 Hz (40 m)	
Gain	0 dB to 10 dB at 100 MHz	
Differential phase error	±10° at 135 MHz at 100 m	
SNR	>70 dB at 100 MHz at 100 m	
Bandwidth	10.2 Gbps	
Return lost	＜-30 dB at 5 KHz	
THD	＜0.005% at 1 KHz	
HDMI standard	Support HDMI 1.4 and HDCP	
Min. to max. level	＜0.3 to 1.45 Vp-p	
Impedance	75Ω	
Temperature	-4 to +158ºF (-20 to +70ºC)	
Humidity	10% to 90%	
Power supply	Input: 100~240 VAC, 50/60 Hz, Output: 24 VDC, 1.25A	
Power consumption	9.6 W	
Case dimension (W × H × D)	4.3 × 1.1 × 3.0 in. (11.0 × 2.8 × 7.7 cm)	4.5 × 1.1 × 3.0 in. (11.3 × 2.8 × 7.7 cm)
Net weight	1.1 lb. (0.5 Kg)	1.1 lb. (0.5 Kg)

Note: All nominal levels are at ±10%.

Panel drawings



Transmitter



Receiver

Troubleshooting and maintenance

- No image on display:
    - Ensure that the display device has been set to the correct input.
    - Ensure that the HDMI cables used for both the source/transmitter and the receiver/display are properly connected and are working. Test the HDMI cables directly from a source to display and ensure their operation.
    - Ensure that the Cat5e/Cat6 cable has not been damaged and that it has been terminated correctly with T568B on both ends. A temporary length of Cat5e/Cat6 can be used for testing to ensure that the devices are all compatible and working properly.
    - Ensure proper grounding of the power supply.
    - Known issues with HDMI 1.2 source devices:
        - Certain cable television STB's are known to have issues with HDBaseT transmission. This is due to their older compatibility (HDMI 1.2). Please contact Clare Controls Customer Support for a solution to these issues.
- Color loss or poor picture quality:
    - Ensure that the HDMI cables used for both the source and transmitter and the receiver and display are properly connected and are of good quality. Test the HDMI cables directly from a source to display and ensure their picture quality.
    - Ensure proper grounding of the power supply.
    - If the static becomes stronger or picture quality becomes worse when connecting the video connectors, this may be due to improper grounding. Check the grounding and make sure all the components are properly grounded to a common ground. Improper grounding may cause damage to the receiver.
    - IR signal problems:
        - When using a control system such as Clare Controls, Crestron, or URC, the 3.5 mm male mono to 3.5 mm male stereo adapter cable (included) must be used. Connect the male mono end to the control system. Connect the male stereo end to the CM-BT10-TX70.

Safety operation

To guarantee the reliable operation of the equipment and personal safety, please follow the procedures listed below.

- The system must be grounded properly. Do not use two blades plugs. Ensure the supply voltage is in the correct range of 100~240 VAC, 50/60 Hz.
- Do not locate the device in a place that is abnormally hot or cold or does not have proper temperature control and ventilation.
- The CM-BT10-TX70 and CM-BT10-RX70 generate heat when operating. Their environment should be well ventilated to prevent damage caused by overheating.
- Disconnect power in humid weather, or when left unused for long periods.
- Before making or removing any connections to the device, ensure that the power supply has been disconnected.
- Do not attempt to open the enclosure of the equipment. Do not attempt any repairs. There are no user-serviceable parts inside. Any attempt to open the equipment will result in a complete void of any warranty and may result in serious injury or death.
- Do not splash any chemical substances or liquids on or around the equipment.

After-sales service

- If there appears to be problems when using the device(s), refer to the “Troubleshooting and maintenance” section in this manual. Return shipping costs are not covered by this warranty.
- You can contact Customer Support at http://support.clarecontrols.com. Please be ready to provide the following information.
    - Product model number, version and serial number.
    - Detailed description of the trouble issues.
    - Description of all connections and 3rd party equipment being used.
- We offer this product with a three-year warranty, which starts from the first day you purchase this product.
- If, during the warranty period, the unit cannot be repaired, a suitable replacement will be issued. Replacement units will be comparable to the original. However, due to potential design changes over time, replacement units may not be identical to the unit replaced.
- Items not covered by this warranty.
    - Damage caused due to incorrect usage and/or connections.
    - Damage caused due to installation by person(s) not adequately trained in the installation of this equipment.
    - Any attempt to open this unit and access internal components shall immediately void this warranty.
    - Damage caused by any physical force (dropping the unit or dropping an object upon the unit, etc.).
    - Damage caused by voltage or cycle fluctuations outside acceptable range.
    - Damage caused by over-current, voltage spikes, or lightning damage due to inadequate surge protection.
- A valid invoice of purchase via an authorized dealer shall be required for any warranty coverage.